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GAS ABSTRACTS

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CONTENTS

2. Appliances 17

3. Combustion and Industrial Furnaces 18

4. Carbonization and Gasification 19

5. Natural Gas and Natural Gas Condensates 22

6. Petroleum and Synthetic Liquid Fuels 27

7. Analytical Methods and Tests 30

8. General and Physical Chemistry 32

9. Organic Chemistry 33

10. Chemical Engineering 34

11. Process Equipment and Instrumentation 35

12. Materials of Construction 36

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2. APPLIANCES

Flame Regulator

Cole, F. B. GAS FLAME REGULATOR. U. S. 2,456, 864 (1948) *December* 21.

Claims are made for a dual liquid change type of thermostat used to control the temperature of a pan on the gas range top burner. The gas flow is begun by merely placing the pan on the burner.

E. F. Davis

Interchangeability

INTERCHANGEABILITY OF OTHER FUEL GASES WITH COKE OVEN GAS. Am. Gas Assoc. Testing Laboratories Research Report No. 1106A (1948) *October.*

The interchangeability of 29 supplemental gases with coke-oven gas of 535 Btu and 0.41 sp. gr. was measured on 17 critical appliances, on 21 pilots and on 6 test burners. Test burners did not adequately distinguish between acceptable and non-acceptable gases. None of the available indices of interchangeability were applicable. This preliminary report presents the experimental data which are to be correlated in forthcoming reports.

A. J. Rudnitzki

LP-Gas Dispenser

Buttner, W. C. GAS DISPENSING SYSTEM. U. S. 2,453,968 (1948) *November* 16.

This invention relates to a device for dispensing liquefied petroleum products partially or completely saturated with pentane, hexane and octane in the form of a gas or vapor mixture for use in household appliances. Propane from a separate storage cylinder and in a gaseous state is allowed to bubble through a liquid butane, pentane, hexane and octane mixture, becomes partially saturated with the vapors of these higher hydrocarbons and is piped to the household appliances.

E. F. Davis

Radiant Heating

Fairbairn, J. K. and Goemann, R. P. PRESENT CHART TO SIMPLIFY DESIGN OF RADIANT HEATING. *Heating, Piping & Air Conditioning* **21**, 120-122 (1949) *January.*

A nomograph for radiant heating design is presented along with an explanation of its use.

E. F. Davis

Steam Tables

McGee, E. A. IMPROVING GAS STEAM TABLES. *Am. Gas Assoc. Monthly* **31**, 21-22, 44-45 (1949) *January.*

A brief abstract is given of a recent report on factors affecting the application of gas to counter appliances. This report was designed to aid those manufacturers of steam and dry warming tables who do not have technical staffs to design the gas heated appliances.

E. F. Davis

3. COMBUSTION AND INDUSTRIAL FURNACES

Gas Turbines

Barr, R. H. H. GAS TURBINES FOR ROAD TRANSPORT. *Gas & Oil Power* (British) **43**, 371-377 (1948) *November.*

Some theoretical considerations for utilizing the gas turbine in automobiles are given. Calculations indicate that 13 miles per gallon of fuel is possible at medium speeds.

E. F. Davis

Generators

Holcroft, W. H. and Larson, M. R. GAS GENERATORS FOR CONTROLLED ATMOSPHERES. *Steel* **124**, 54-55 (1949) *January* 24.

A brief description is given of endothermic and exothermic gas generators employed in metallurgical processing.

E. F. Davis

Infra-red Radiation

Yarham, E. R. INFRA-RED RADIATION AND THE DRYING OF REFRACTORIES. *Ind. Gas* **27**, 11-13, 22-23 (1949) *January.*

It is shown that the rate of radiant heat transfer is greater than convection transfer provided the temperature difference is over 1000°F. Infra-red radiation is best applied to small objects since it will give an even temperature throughout. When heating very large objects the surface temperature is much higher than the temperature in the center. These large temperature gradients can cause damage to the object particularly in drying of refractories.

E. F. Davis

Premixed Combustion

Funk, E. J., Jr. PRE-MIXED COMBUSTION FOR MORE EFFICIENT PROCESS HEATING IN INDUSTRY. *Ind. Heating* **15**, 1896, 1898, 1900, 1902, 1904, 1906, 1916 (1948) *November.*

See *Gas Abstracts* **4**, 82 (1948) *May* for abstract.

Steel Forging

Eeles, C. C. THE ROLE OF GAS IN MODERN STEEL FORGING. *Gas* **24**, 38-42 (1948) *December.*

See *Gas Abstracts* **5**, 2 (1949) *January* for abstract.

Utilization

Dickinson, F. COMMERCIAL AND INDUSTRIAL UTILIZATION OF GAS—PART I. *Gas J.* (British) **257**, 33-34 (1949) *January* 5.

This is the first of twelve articles to be published on the commercial and industrial utilization of gas. The main topic has been divided into the following twelve sub-titles: (1) general commercial and industrial applications, (2) combustion, (3) heat transfer, losses, recovery, (4) general types of process application, (5) ferrous and non ferrous processes, (6) drying and similar processes, (7) glass, (8) food purification, (9) hot water and steam, (10) space heating, (11) temperature measurement, control and protective equipment, and (12) general summary.

E. F. Davis

4. CARBONIZATION AND GASIFICATION

Bituminous Coal Study

Blayden, H. E., Gibson, J. and Riley, H. L. A STUDY OF BITUMINOUS COAL BY (a) EXHAUSTIVE SOLVENT EXTRACTION AND (b) X-RAY DIFFRACTION. *J. Chem. Soc.* (British) **1948**, 1693-1700 *(October)*.

A semimicro-method for the exhaustive solvent extraction of coal with pyridine and chloroform is described. This method has been used in a detailed study of the *effect of carbonisation and oxidation* on the yield of alpha (pyridine insol.) beta (pyridine-sol., chloroform-insol.), and gamma (pyridine-and chloroform-sol.) fractions. The three fractions from the unoxidized and oxidized coals and the chars and cokes obtained from them at various temperatures have been examined by X-ray powder photography, and the results obtained provide further evidence in support of the views already advanced concerning the importance of the proportion of oxygen in determining the crystallographic behavior of a carbonaceous substance on carbonization. Although the caking properties of the original coal were completely destroyed by the oxidation, the gamma-extract from the oxidized coal still caked strongly on carbonization.

Authors' abstract

Abstractor's Note—Carbonization, underlined by this abstractor above, was on a series of six samples, with preheating, of each to a definite finishing temperature, 100 to 600°C. Increase in amount of beta and gamma fraction on preheating in the range 200 to 300° is of interest in connection with the work published by R. A. Mott and his students in 1930-1933 on coal expansion, wherein the "oily material" formed was indicated as having profound effects upon subsequent coal-carbonization reactions. The present authors think that the increase in these fractions may be due to cracking of complexes, or to desorption of bitumens from the alpha carbon. Explanation of "why does coal coke?" and the associated question concerning coke structure, strength and reactivity as well as coal plasticity, fluidity and expansion will be hastened by the extension of such fundamental studies of coal.

O. P. Brysch

Carbon Deposition

Iley, R. and Riley, H. L. THE DEPOSITION OF CARBON ON VITREOUS SILICA. *J. Chem. Soc.* (British) **1948**, 1362-1366 *(September)*

Three types of carbon deposited on a fused silica surface from methane, propane, butane, ethylene and benzene at temperatures ranging from 1470 to 2370°F were examined by X-ray diffraction. The three types—vitreous, soft and filamentous—are all microcrystalline, similar in crystallite size to carbons made by carbonization. The crystallites present in the vitreous and filamentous varieties have dimensions which increase with the temperature of deposition and which are larger than those present in the soft black type. The carbons have reactivities with oxygen which are quite similar to that of macrocrystalline graphite. Formation of a white form of carborundum by the interaction of ethylene and silica was noted at temperatures of 2190 to 2370°F.

C. H. Riesz

Distribution

Dixon, O. K. WELDING METHODS AND EQUIPMENT FOR CONSTRUCTION AND MAINTENANCE OF GAS MAINS AND SERVICES. *Am. Gas J.* **170**, 22-25 (1949) *January*.

The shortage of standard pipe fittings has forced many companies to rely on welding methods for maintenance and construction work on gas mains. The author's company uses electric arc welding on pipe 3 inches and over and

acetylene welding on service pipe and small mains. This company equipped its service trucks with acetylene generators and when necessary towed a portable gasoline driven arc welder. These trucks were further equipped with a winch and power take off to facilitate ditching and filling as well as pipe laying. Welding methods are also used in repairing leaks in mains with the advantage of a repair job as permanent as the original pipe. Welding methods give quick construction, fewer materials, and lower inventories.

W. G. Bair

Ethylene Recovery

Schuftan, P. M. THE RECOVERY OF ETHYLENE FROM COKE OVEN GAS. *Coke & Gas* (British) **1949**, 27-31 *(January)*

See *Gas Abstracts* **4**, 230 (1948) *December* for abstract.

Purification

Plant, J. H. C. and Newling, A. B. S. CATALYTIC REMOVAL OF ORGANIC SULFUR COMPONENTS FROM COAL GAS. *Gas World* (British) **129**, 807-808 (1948) *November* 27.

The main features of existing full-scale catalytic processes for sulfur removal operating in Great Britain are summarized. Nickel subsulfide catalyst is employed in both the South Metropolitan Company's process and the Gas Light and Coke Company's process; the former reducing organic sulfur to H_2S at temperatures of 410 to 440°C provided by external heating, and the latter oxidizing organic sulfur to SO_2 at temperatures of 230 to 360°C provided by internal heat from the combination of hydrogen and oxygen in the catalyst zone. The Holmes-Maxted process employs copper or nickel thiomolybdate catalysts to reduce organic sulfur to H_2S at temperatures of 330 to 380°C provided by a combination of internal and external heating. After 10 years of plant and laboratory experience with coal gas at the Gas Light and Coke Company, it has been concluded that: (1) the practical limit for organic sulfur removal, thiophene excepted, is 3 gr/100 cu ft; (2) the continuous catalytic decomposition of thiophene in coal gas does not appear to be practical; (3) the most suitable industrial catalyst for sulfur removal appears to be nickel subsulfide on china-clay support; (4) the optimum working range of the catalyst is 330 to 380°C; (5) heat economy is more dependent upon heat-exchange and thermal insulation than catalyst temperature; and (6) horizontal gas flow provides more uniform gas distribution across the catalyst bed.

H. Hakewill

Williamson, R. H. and Garside, J. E. APPLICATION OF FLUIDIZED SOLIDS TECHNIQUE TO COAL GAS PURIFICATION. *Gas World* (British) **129**, 809-811 (1948) *November* 27.

Advantages claimed for a fluidized purification process are: (1) continuous operation; (2) reduced labor costs; (3) steady labor demand; (4) less ground area required for the plant; (5) no air need be added to the gas; (6) uniform and controlled oxide temperature; (7) oxide caking reduced; (8) shaving or sawdust fillers eliminated; and (9) preparation of recovered sulfur in pure form simplified. Disadvantages include the higher inlet gas pressure required to achieve fluidization, the incompleteness of oxide reaction in a single stage continuous fluidized process, and the accumulation of water in the reactor. Experiments using nitrogen carrying 600 gr H_2S/100 cu ft were conducted in a reactor of 2 in. diameter with bed depths up to 3 ft. An air-dried iron oxide powder with particles ranging from 0.0004 to 0.03 cm. was fluidized at a linear gas velocity of 1 ft per sec. Under these conditions substantially complete H_2S removal was maintained for two hours. Loss of efficiency after the initial two hour period was attributed to the increasing proportion of fouled oxide and the agglomeration of particles caused by the water formed during the reaction.

H. Hakewill

Solid Fuel Analysis

Edwards, A. H. THE ANALYSIS AND TESTING OF SOLID FUEL. PART II—CALORIFIC VALUE AND MINERAL MATTER. *Bull. Brit. Coal Utilization Research Assoc.* **12**, 317-321 (1948) *September.*

This is a continuation of the author's review of the literature on methods. Calorific value is discussed with inclusion of 13 recent references and comparison of 17 formulas for calculating the calorific value from ultimate analyses. Methods on specific inorganic constituents are included in 8 references. Under assessment of the mineral matter of coals for purposes of coal classification, 14 references are reviewed (with inclusion of earlier work). Twelve mineral-matter formulas are compared.

O. P. Brysch

Reynolds, F. M. THE OCCURRENCE OF VANADIUM, CHROMIUM, AND OTHER UNUSUAL ELEMENTS IN CERTAIN COALS. *J. Soc. Chem. Ind.* (British) **67**, 341-345 (1948) *September.*

Investigation has shown that many deposits of vitrain type, occurring in isolated lumps or bands in rocks of various types found in North Staffordshire and North Wales, contain appreciable quantities of vanadium, chromium, titanium, nickel, boron, lead, germanium, and strontium. Substantial amounts of copper pyrites were also found, but commercial recovery was deemed unfeasible. Speculation regarding the mechanism of these deposits is advanced by the author. Spectrographic examination of vitrain ashes showed the elements: antimony, barium, caesium, molybdenum, phosphorus, rubidium, zinc, arsenic, beryllium, cobalt, indium, lanthanum, manganese, silver, and tin were present in trace quantities in addition to those previously named.

H. Hakewill

Sulfur in Gas

Eaton, S. E., Hyde, R. W. and Old, B. S. TRACER STUDY OF SULFUR IN THE COKE OVEN. *Metals Technol.* **15**, TP-2453 (1948) *October.*

A study was made using radioactive tracers to determine the principal sources of sulfur in coke. A small amount of iron pyrites prepared from radioactive sulfur was mixed with the coal charged to one full-scale coke oven and the mixture coked under normal conditions. The course of the pyritic sulfur was traced to determine the quantity evolved in the gas and that remaining in the coke. This test indicated that neither pyritic or organic sulfur is preferentially removed during coking. The effect of coals high in sulfate sulfur could not be judged from this experiment. It was observed that organic sulfur is initially evolved more rapidly than the pyritic form, but upon completion of the coking period it was found that the pyritic and organic sulfur appear in coke in proportion to their concentration in the coal charge. Thus it was generally concluded that in order to produce low sulfur coke, coals low in total sulfur must be used.

H. Hakewill

Whittingham, G. THE INFLUENCE OF SILICA SMOKES ON THE DEWPOINT OF COMBUSTION GASES CONTAINING SULFUR OXIDES. *J. Soc. Chem. Ind.* (British) **67**, 411-414 (1948) *November.*

Results of experimental work are presented to show how the dewpoint of combustion gases containing sulfur oxides decreases with increasing concentration of silica, such as is released from the ash in high temperature fuel beds. Using a fully aerated coal gas flame containing sufficient SO_2 to yield an acid dewpoint of 140°F, it was demonstrated that the addition of SiO_2 in concentrations up to 0.001 g/1 brought about little change in dewpoint; but as the SiO_2 concentration increased from this value, dewpoint reduction resulted until a minimum of 60°F was reached at 0.004 g/1 SiO_2. It is believed that

adsorption of SO_3 by the silica smoke particles causes some of the dewpoint reduction observed; and it is postulated that the remainder is due to the tendency for silica smoke to inhibit the oxidation of SO_2 to SO_3 in the flame.

H. Hakewill

Synthesis Gas Production

Reed, R. M. and Eriksen, A. HYDROGEN AND SYNTHESIS GAS PRODUCTION. *Petroleum Processing* **3**, 1011-1012, 1014-1016 (1948) *October; Gas* **24**, 53-56 (1948) *October.*

See *Gas Abstracts* **4**, 193 (1948) *October* for abstract.

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Beckmann, P. A CONTINUOUSLY INDICATING METHOD FOR THE DETERMINATION OF OXYGEN IN INDUSTRIAL Gases. p. 30.

Epstein, B. LOGARITHMICO-NORMAL DISTRIBUTION IN BREAKAGE OF SOLIDS. p. 34.

Erwin, J. H. GAS CONDITIONING. p. 22.

Kemen, W. E. SYSTEM DEVELOPMENT FOR INCREASED LOADS. p. 23.

Riley, H. L. SOME STRUCTURAL ASPECTS OF CARBON OXIDATION. p. 32.

Schreiner, W. J. CATHODIC PROTECTION APPLIED TO GAS AND ELECTRIC UTILITY OPERATIONS. p. 25.

Smith, C. P. ESTIMATING FUTURE PEAK LOADS. p. 24.

THE DESIGN OF PIPE STILLS. p. 29.

INTERCHANGEABILITY OF OTHER FUEL GASES WITH COKE OVEN GAS. p. 17.

5. NATURAL GAS AND NATURAL GAS CONDENSATES

Carbon Black

Stokes, C. A. and Dobbin, R. E. CARBON BLACK SHIFTS TO FURNACE PROCESS. *Chem. Ind.* **64**, 40-43, 104 (1949) *January.*

Flow sheets are given for the channel black and furnace black processes. Recent advances in technology are discussed. Furnace black has been so greatly improved that it now appears to be preferable for use in GRS and cold rubber. Increased quality has been accompanied by decreased yield and higher cost.

J. D. Parent

Changeover

Erwin, J. H. GAS CONDITIONING. *Gas Age* **102**, 14-15, 52 (1948) *December* 23.

Oil fogging and steam saturation are believed to have value in avoiding leak and dust troubles when changing from manufactured to natural gas. If considerable time elapses after the changeover before these procedures are applied they will not be effective.

J. D. Parent

Compressors

Barrett, W. R. COMPRESSOR CYLINDER CLEARANCE. *Oil Gas J.* **47**, 60-61, 63 (1948) *December* 23; OPERATING FLEXIBILITY FOR PROCESS GAS COMPRESSORS. *Petroleum Refiner* **28**, 93-97 (1949) *January.*

Compressors with slight clearance are not adapted to service where the suction pressure or gas flow rate varies greatly. To offset this, cylinders have been designed with clearance pockets in the heads or cylinder barrel. Such

devices have been found to have slight effect in power requirements. A new design is described in which clearance pockets within the piston are utilized. This space is sectionalized and removable plugs control the amount used. This device is used in addition to the presently employed clearance pockets.

J. D. Parent

Hicks, T. G. DESIGNING GAS COMPRESSOR STATIONS. PART II. *Petroleum Refiner* 28, 123-125 (1949) *January.*

The design of building, foundations and water cooling system was discussed in the first installment. The present section covers design of oil cooling, air intake and exhaust and piping systems.

J. D. Parent

Conservation

Baker, W. L. GREAT STRIDES IN CONSERVING TEXAS CASINGHEAD GAS. *World Oil* 128, 32-34 (1949) *January.*

New construction will permit the conservation of 2¼ billion cu ft of casinghead gas daily in Texas. Economic problems of conservation are discussed.

J. D. Parent

Distribution

Kemen, W. E. SYSTEM DEVELOPMENT FOR INCREASED LOADS. *Gas Age* 102, 23-24, 54 (1948) *December* 23.

Design procedures used by the author for the Milwaukee distribution system are presented.

J. D. Parent

Dry Ice Manufacture

Gard, C. D. THE EXTRACTION OF CO_2 GAS FROM NATURAL GAS AND THE MANUFACTURE OF DRY ICE THEREFROM. *Calif. Oil World* 41, 3, 5, 7, 9, 11, 13, 15 (1948) *December, 2nd issue.*

This article gives a detailed description of the plant and equipment set up to extract CO_2 from natural gas. This plant is operating on gas from the Santa Maria oil field in California. This gas is high in CO_2 and H_2S (16% CO_2, H_2S 34 gr/100 ft^3). The CO_2 is extracted by the Girbotol system using monoethanolamine as a solvent. It was believed this system would give a CO_2 low in H_2S since the CO_2 was to be used in the manufacture of dry ice. This system in operations delivers 130 tons of CO_2 per day to the dry ice plant with a H_2S concentration of 3-4 gr/100 ft_3. In the dry ice plant the CO_2 is further purified and then compressed, dehydrated, and liquefied. The liquid CO_2 is pumped into the dry ice presses and allowed to flash through vents back to the compressor. The resulting snow is then compressed and shipped at once or stored. Shipment from the plant can be made by railroad or truck. This process gives the producer a higher Btu gas to market at a more advantageous price and a profitable by-product dry ice.

W. G. Bair

Hydrates

Deaton, W. M. and Frost, F. M., Jr. GAS HYDRATES IN NATURAL GAS PIPE LINES. U.S. Bureau of Mines Monograph No. 8.

This is a summary of the work done at the Bureau of Mines on the study of gas hydrates. Equilibrium data for a number of natural gases, certain pure gases and synthetic mixtures are presented. Methods and equipment for determining the water vapor content of gases are given and moisture saturation data for compressed gas are presented.

J. D. Parent

LP-Gases

Glendening, A. S., and Sanderson, C. F. SHORT-CUT PROCESS DESIGN METHODS FOR HIGHER PROPANE RECOVERY. *Petroleum Processing* 4, 27-30 (1949) *January.*

Means of increasing propane recovery are reviewed and analyzed. A theoretical analysis of a rich oil deethanizer is begun. Further installments are to feature short cut design procedures.

J. D. Parent

Kniel, L. PROPANE RECOVERY BY ABSORPTION. *Petroleum Refiner* 27, 588-593 (1948) *November;* Petroleum Processing 3, 1066, 1068-1069, 1071-1072 (1948) *November.*

The fractionating absorber is said to offer attractive possibilities for increased propane recovery in natural gasoline absorption plants. In practice a feed gas cooler, intercoolers for the absorption section and a reboiler for the stripping section are employed. An internal recycle stream between the lower and upper sections of the tower is thus provided. A simplified mathematical analysis and some sample calculations are given.

J. D. Parent

Thornton, D. P., Jr. HIGHER PROPANE YIELDS IN GASOLINE PLANTS BY HYPERSORPTION PROCESS. *Petroleum Processing* 3, 1052-1054 (1948) *November.*

Extraction of LP-gas by the hypersorption process, i.e., countercurrent adsorption by a downwardly moving bed of granular adsorptive carbon, is now considered to be economical. 98.5% recovery of propane even when the raw gas contains as little as 1.5% is expected. A number of details concerning the proposed application of the process are given.

J. D. Parent

Natural Gasoline

Stormont, D. H. SUN'S NATURAL-GASOLINE PLANT SERVES THREE FIELDS IN NORTHERN LOUISIANA. *Oil Gas J.* 47, 68-69, 71, 75-76 (1949) *January* 13.

A flow sheet is given for a plant taking 14 MMcf per day at a suction of 10 inches of mercury vacuum and recovering 60% propane. A detailed flow sheet including instrumentation is given.

J. D. Parent

Peak Load

Smith, C. P. ESTIMATING FUTURE PEAK LOADS. *Am. Gas Assoc. Monthly* 30, 13-16, 40 (1948) *October.*

Trends of customer demands, population increase and depletion of natural gas reserves in California are analyzed and predictions made for 1960 and 1970. Various methods of meeting peak loads were considered. Up until 1960, propane-air appears to be a practical solution and is lowest in installed cost ($12.50 per Mcf/day, exclusive of storage). The cost of storing propane is relatively high and research in developing peak load plants based on lower vapor pressure material, such as gasoline, appears desirable.

C. H. Riesz

Pipe Lines

Hunter, J. B., McConomy, H. F. and Weston, R. F. ENVIRONMENTAL pH AS A FACTOR IN CONTROL OF ANAEROBIC BACTERIAL CORROSION. *Oil Gas J.* 47, 249-250 (1948) *November* 11.

Anaerobic corrosion is caused by a specific type of bacteria which are active in soil not containing free oxygen. The action is influenced by organic matter, and the pH and mineral content of the soil moisture. The bacteria get their

oxygen by reducing sulfate ions in the presence of hydrogen to H_2S which forms FeS with the iron of the pipe. A study is reported which indicates that control of pH may be used to inhibit bacterial corrosion.

J. D. Parent

Schreiner, W. J. CATHODIC PROTECTION APPLIED TO GAS AND ELECTRIC UTILITY OPERATIONS. *Corrosion* 5, 17-24 (1949) *January.*

Detailed examples of cathodic protection as applied to underground power cables, and gas transmission and distribution lines are given. Leak records and soil surveys made on location of the underground lines were used as examples. A single anode system and a distributed galvanic anode system are used for the cathodic protection of the transmission and distribution lines respectively.

B. E. Hunt

Production

Calhoun, J. C. ENGINEERING FUNDAMENTALS. USE OF K_g/K_o RATIO. *Oil Gas J.* 47, 79 (1948) *December* 23.

The use of relative permeability to gas and oil in providing working basis for gas drive calculations is reviewed.

J. D. Parent

Erwin, W. C. SURFACE RECORDING OF BOTTOM-HOLE PRESSURES. *Oil Gas J.* 47, 116, 118, 120, 123 (1948) *November* 25.

A device which is used in connection with gun perforating and casing testing to record at the surface the bottom hole pressure is sketchily described. Samples of the fluid entering the operating string can also be taken as often as is desired. Information regarding all phases of the test is recorded and can be interpreted at once.

O. T. Bloomer

Gouldy, R. and Stine, G. R. SUCCESSFUL GAS REPRESSURING IN NORTH TEXAS. *World Oil* 128, 126-130, 132, 134, 136, 138 (1949) *January.*

Some successful experiences with gas repressuring in North Texas are related.

J. D. Parent

Stoltenberg, H. A. OXYGEN CONCENTRATION EFFECT ON FLOOD WATER IRON PICKUP. *World Oil* 128, 154, 156 (1949) *January.*

Tests are reported on the effect of partial and complete removal of dissolved oxygen from three types of water. The reduction of their corrosiveness is measured by their decrease in iron pickup. The results indicate that iron pickup is proportional to oxygen content down to approximately 2 ppm after which the corrosion was slight.

B. E. Hunt

Wible, J. P. APPLICATION OF SECONDARY RECOVERY METHODS. *World Oil* 128, 145-146, 148 (1949) *January.*

The optimum type of secondary recovery method depends on the volume of oil left in the reservoir, the character of the producing sand and various economic factors. The cost of additional recovery should be carefully estimated.

J. D. Parent

Purification

Blohm, C. L. and Chapin, W. F. PURIFICATION AND DEHYDRATION OF GASES. *Oil Gas J.* 47, 75, 77, 81-82, 85 (1948) *November* 18.

The purification and dehydration of sour gases using ethanolamine solutions and glycol-amine solutions is reviewed. Flow sheets of several cycles are included along with some operating data and a discussion of the advantages of each. Approximate cost data are included.

O. T. Bloomer

Research

Cattell, R. A. and others. REPORT OF PETROLEUM AND NATURAL GAS DIVISION FISCAL YEAR 1947. *U. S. Bureau of Mines Information Circular* 7484 (1948) *December.*

Gas and oil production research conducted by the U.S. Bureau of Mines is summarized in this report. Included are studies of natural gas hydrates, pipe line flow, nitrogen removal from natural gas and thermodynamic properties of petroleum hydrocarbons.

J. D. Parent

Storage

Burgoyne, J. H. and Richardson, J. F. FIRE AND EXPLOSION RISKS ASSOCIATED WITH LIQUID METHANE. *Fuel* (British) 27, 37-42 (1948) *May-June.*

The factors contributing to the hazards of fire and explosion of liquid methane are analyzed. Various methods of controlling fires or preventing their occurrence are considered. It was concluded that foams are the most satisfactory types of extinguishers.

S. Katz

Transmission

Miller, B. GAS TRANSPORTATION SYSTEM CALCULATIONS—PART IV—NO. XXXX IN A SERIES. *Gas Age* **102**, 25-30 (1948) *December* 23.

Every transmission system should have a plan for future expansion. Increased capacity can be achieved by the use of higher pressure, more compressor stations, and looping of lines. All possibilities are critically evaluated.

J. D. Parent

Water Treatment

Ulmer, R. C. and Churchill, J. F. pH CONTROL THROUGH USE OF A SULFUR BURNER *Petroleum Refiner* **28**, 120-122 (1949) *January;* SULFUR BURNER. *Chem. Eng.* **56**, 95 (1949) *January.*

See *Gas Abstracts* 4, 215 (1948) *November* for abstract.

Water Vapor Determination

Davis, D. S. NOMOGRAPH FOR DETERMINATION OF WATER-VAPOR CONTENT OF NATURAL GAS. *Chem. Ind.* **63**, 1020 (1948) *December.*

The author has provided a simple nomograph for the determination of the saturation moisture content of compressed natural gas. The primary data are those recently supplied by Amero, et al, *Chem. Eng. Progress* **43**, 349 (1947).

J. D. Parent

The following article, which has not been abstracted, is called to your attention:

Gard, C. D. UNION OIL CO. FIRST PLANT TO MAKE DRY ICE FROM OIL-WELL GAS. Oil Gas J. 47, 56-59, 61 (1949) *January* 6.

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Buttner, W. C. GAS DISPENSING SYSTEM. p. 17

Dixon, O. K. WELDING METHODS AND EQUIPMENT FOR CONSTRUCTION AND MAINTENANCE OF GAS SERVICES. p. 19.

Gibbon, A. SHELL STARTS TO PROVE RICH CONDENSATE AREA. p. 29.

Stoll, H. W. FLUID FLOW MEASUREMENT IN PIPE SIZES BELOW TWO INCHES. p. 34

6. PETROLEUM AND SYNTHETIC LIQUID FUELS

Acetylene

Sherwood, P. W. ACETYLENE FROM PETROLEUM GASES. *Petroleum Refiner* **27**, 573-576 (1948) *November.*

The methods and costs of producing acetylene from hydrocarbon gases are reviewed, compared and discussed. Three general methods have been investigated: (a) electrical discharge; (b) pyrolytic (atmospheric and vacuum); and (c) simultaneous combustion using oxygen. The costs per pound of acetylene by these methods appear competitive with acetylene generated from calcium carbide.

C. H. Riesz

Catalysts

Baker, M. O., Chesnutt, S. D. and Wier, T. P., Jr. A CONTRIBUTION TO THE KNOWLEDGE OF SODIUM CONTAMINATION ON CRACKING CATALYSTS. *J. Phys. & Colloid Chem.* **52**, 1364-1372 (1948) *November.*

The concentration of sodium upon the surface of commercial silica-alumina cracking catalyst was determined by acid extraction. The surface area and surface sodium concentration both decreased with use, the latter, being less rapid, resulted in an increase of sodium per unit of surface area. The effect of carbon deposition upon the surface sodium was observed and interpreted in terms of the surface distribution and mode of attachment of sodium to the surface. No correlation with catalytic activity was made.

C. H. Riesz

Oulton, T. D. THE PORE-SIZE-SURFACE AREA DISTRIBUTION OF A CRACKING CATALYST. *J. Phys. & Colloid Chem.* **52**, 1296-1314 (1948) *November.*

The complete nitrogen adsorption-desorption isotherm for an activated natural clay cracking catalyst (Filtrol) was obtained. A method for determining pore size-surface area distribution is presented and an idealized structure model of the cracking catalyst is proposed on the basis of physical measurements.

C. H. Riesz

Fischer-Tropsch Synthesis

Anderson, R. B., Krieg, A., Seligman, B. and Tarn, W. FISCHER-TROPSCH COBALT CATALYSTS. *Ind. Eng. Chem.* **40**, 2347-2350 (1948) *December.*

The effects of varying the kieselguhr component in cobalt-thoria-magnesia-kieselguhr (100:6:12:200 weight ratio) catalysts upon the Fischer-Tropsch synthesis of hydrocarbons have been evaluated. Chief purpose of the work was to study commercially available American kieselguhrs suitable for use in cobalt synthesis catalysts. Calcined kieselguhrs produced catalysts of lower activity than did natural kieselguhrs Acid extracted natural kieselguhrs produced catalysts of the highest activity; catalytic activity varied more or less inversely with the percentage of iron in the carrier. The density of the finished catalyst varied directly with the density of the kieselguhr. The more dense catalysts produced a larger fraction of light gaseous hydrocarbons and carbon dioxide (both generally undesirable).

C. H. Riesz

Ayres, E., Montgomery, C. W. and Hirsch, J. H. SOME PROBLEMS ASSOCIATED WITH THE FISCHER-TROPSCH PROCESS. *Petroleum Refiner* **27**, 583-585 (1948) *November.*

The technical difficulties which block the successful application of the Fischer-Tropsch are

discussed: carbon disintegration of the catalyst; wax agglomeration in fluidized beds; low thermal efficiency; cooling water requirements (29 to 36 gallons per gallon of synthetic oil); high power requirements (2000 volumes of synthesis plus recycle gases to produce one volume of liquid, operating pressure 300 psig); and use or disposal of oxygenated hydrocarbon byproducts. It is suggested that the emphasis might be shifted from applying engineering to the existing processes to the conception of a basically new process.

C. H. Riesz

Dazeley, G. H. and Hall, C. C. PRODUCTION OF OLEFINS BY THE CRACKING OF FISCHER-TROPSCH WAXES AND THEIR CONVERSION INTO LUBRICATING OILS. *Fuel* (British) **27**, 50-55 (1948) *May-June*.

Waxes obtained from both atmospheric and medium pressure Fischer-Tropsch synthesis were subjected to non-catalytic vapor phase cracking at 932 to 1184°F and at atmospheric pressure. Yields, composition and properties of the products were determined and were substantially the same for the two waxes. Various fractions containing substantial quantities of olefins were polymerized in the presence of aluminum chloride catalyst. Results are compared with previous data obtained from the processing of diesel oil. It was concluded that mere increase in the chain length of the olefin does not lead to improved oxygen stability of the polymerized oil.

C. H. Riesz

Kummer, J. T., DeWitt, T. W. and Emmett, P. H. SOME MECHANISM STUDIES ON THE FISCHER-TROPSCH SYNTHESIS USING C^{14}. *J. Am. Chem. Soc.* **70**, 3632-3643 (1948) *November*.

Studies of the Fischer-Tropsch synthesis of hydrocarbons by means of radioactive C^{14} as a tracer indicate that the greater part of the products are formed by some mechanism other than the reduction of carbide as an intermediate. Only about 10% of the hydrocarbon product appears to have been formed through a carbide for iron catalysts at or below 500°F and for a cobalt catalyst at 392°F. The experimental evidence is described and discussed in detail.

C. H. Riesz

Schuman, S. C. THE ROLE OF THE CARBIDES OF IRON IN THE FISCHER-TROPSCH SYNTHESIS. *J. Chem. Phys.* **16**, 1175 (1948) *December*.

Equilibrium constants for the interaction of iron carbide (Fe_2C), carbon monoxide and hydrogen to form higher hydrocarbons and water at 441°F and 621°F are calculated. It is indicated that thermodynamic equilibrium calculations alone do not eliminate the possibility that iron carbide is an intermediate in Fischer-Tropsch hydrocarbon synthesis. (Disagrees with Kummer, Browning and Emmett, *Gas Abstracts* **4**, 175 (1948) *September*).

C. H. Riesz

Storch, H. H., Anderson, R. B., Hofer, L. J. E., Hawk, C. O., Anderson, H. C. and Golumbic, N. SYNTHETIC LIQUID FUELS FROM HYDROGENATION OF CARBON MONOXIDE. PART I—REVIEW OF LITERATURE. BUREAU OF MINES RESEARCH ON EFFECT OF CATALYST PREPARATION, REDUCTION, AND INDUCTION PROCEDURES ON ACTIVITY: CORRELATION OF PHYSICAL PROPERTIES OF THE CATALYSTS WITH THEIR ACTIVITY. U. S. Bureau Mines Technical Paper 709 (1948).

The activities of the Bureau of Mines in investigating the production of synthetic liquid fuels by the hydrogenation of carbon monoxide (Fischer-Tropsch process) are reviewed up to October, 1946. Some 70 pages of the report reviews published information on the synthesis and its products. The remainder of the paper describes the experimental work of the Bureau during the period 1943-1946. Catalysts, catalyst preparation, reduction, and induction pretreatment of catalysts were investigated in a battery of 12 catalyst testing units. Both iron and cobalt catalysts were investigated extensively in tests of extended duration (100 to 2200

hours). Data on X-ray diffraction patterns, magnetic susceptibility, surface area and porosity are presented. These physical properties are correlated with catalyst activity in specific cases. 213 pages including indices.

C. H. Riesz

Knocking Characteristics

Lovell, W. G. KNOCKING CHARACTERISTICS OF HYDROCARBONS. *Ind. Eng. Chem.* **40**, 2388-2438 (1948) *December.*

Data on the knocking characteristics of more than 325 pure hydrocarbons are reviewed, tabulated and discussed. Data for the various hydrocarbon gases are included.

C. H. Riesz

Naphtha Polyforming

Offutt, W. C., Fogle, M. C. and Beuther, H. UTILIZATION OF REFINERY GASES BY THE POLYFORM PROCESS. *Petroleum Processing* **3**, 1083-1088, 1089-1090 (1948) *November.*

See *Gas Abstracts*, 4 235 (1948) *December* for abstract.

Pipe Still Furnace

THE DESIGN OF PIPE STILLS. *Coke & Gas* (British) **10**, 421-427 (1948) *December.*

General aspects of pipe still furnace design are given. Heat releases of 7000-14000 Btu per hr per cu ft of furnace volume and heat absorptions of 7000-13000 Btu per hr per sq ft of tube surface are figures which are commonly used in design of furnaces. The use of the ASTM, true boiling point distillation, and equilibrium flash vaporization curves was illustrated as applied to estimation of percentage vaporization of the feed stock in the furnace.

W. J. Merwin

Production

Gibbon, A. SHELL STARTS TO PROVE RICH CONDENSATE AREA. *World Oil* **128**, 48, 50 (1949) *January.*

Shell is now engaged in testing an area in western Oklahoma which may prove to be a very large condensate producer.

J. D. Parent

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Cattell, R. A. and others. REPORT OF PETROLEUM AND NATURAL GAS DIVISION. FISCAL YEAR 1947. p. 26.

Edmister, W. C. APPLICATIONS OF THERMODYNAMICS TO HYDROCARBON PROCESSING. PART XIII—HEAT CAPACITIES. p. 33.

Fuidge, G. H., Deadman, A. L. and Hutton, A. L. THE E.V.T. VISCOMETER. p. 31.

Hinden, S. G. and Grosse, A. V. A LAMP FOR BURNING HIGH-BOILING PETROLEUM FRACTIONS. p. 30.

Hooper, J. H. D. DETERMINATION OF DISSOLVED OXYGEN (IN HYDROCARBON OILS). p. 31.

Morris, A. E., Lacombe, R. E. and Lane, W. H. QUANTITATIVE DETERMINATION OF ELEMENTAL SULFUR IN AROMATIC HYDROCARBONS. p. 31.

Rescorla, A. R. and Trew, D. V. A REVIEW OF LABORATORY FUEL-OIL STABILITY TESTS. p. 30.

Thornton, D. P. Jr. HIGHER PROPANE YIELDS IN GASOLINE PLANTS BY HYPERSORPTION PROCESS. p. 24.

7. ANALYTICAL METHODS AND TESTS

Distillation Apparatus

Rolfson, F. B., Penther, C. J. and Pompeo, D. J. AUTOMATIC DISTILLATION APPARATUS FOR A.S.T.M. METHOD D-86. *Anal. Chem.* 20, 1014-1019 (1948) *November.*

An apparatus for the automatic distillation of products such as cracked and aviation gasoline, kerosene, benzene and special solvents is described. The operator has but to charge the sample and set the initial heat. The apparatus automatically distills at the rate required by A.S.T.M., records the initial boiling point, distillation curve and end point, shuts off and resets for the next sample. The apparatus is complete in a compact unit including an electric heater, a thermocouple mounting, a cooling chamber for the distillate and receiver, and a recording device for plotting the distillation curve. Results are shown which fall within the A.S.T.M. limits.

R. D. Clevenger

Fuel-Oil Stability Tests

Rescorla, A. R. and Trew, D. V. A REVIEW OF LABORATORY FUEL-OIL STABILITY TESTS. *Oil Gas J.* 13, 238-249 (1948) *July.*

Comparisons between known and published tests and newer test methods for determination of storage stability of fuel oils are presented. Procedure for these tests are included and results compared. The tests are divided into three general groups. In the first group the sample is evaporated at an elevated temperature and the residue measured as an indication of the gumming tendency or stability of the fuel. The second general group consists of controlled oxidation of the sample and determining the naphtha insoluble material resulting from this oxidation. In the third group the acid reactive constituents in the fuel are precipitated as an acid floc by treatment with HCl. The naphtha insoluble and acetone methanol soluble materials are then determined.

R. D. Clevenger

Lamp Test

Hinden, S. G. and Grosse, A. V. A LAMP FOR BURNING HIGH-BOILING PETROLEUM FRACTIONS. *Anal. Chem.* 20, 1050-1052 (1948) *November.*

A modified lamp design for extending the limits of combustion to high boiling petroleum fractions (250 to 500°C) is described. The modifications are; elimination of secondary air supply, shortening of the wick, and instituting a hydraulic head reservoir to facilitate flow of the hydrocarbon through the wick. Carbon and hydrogen determinations comparable to the ultimate train and sulfur determinations comparing favorably with the bomb procedure have been made. The apparatus was applied to the combustion of bottoms samples, but no satisfactory results were obtained.

R. D. Clevenger

Oxygen Determination

Beckmann, P. A CONTINUOUSLY INDICATING METHOD FOR THE DETERMINATION OF OXYGEN IN INDUSTRIAL GASES. *Chem. & Ind.* (British) 791-794 (1948) *December* 11.

The development of a dropping mercury electrode polarographic cell for the continuous measurement of the oxygen content of retort gas is described. The instrument consists of three main parts: (1) a gas purifying train to remove oil droplets, H_2S, and NH_3; (2) a polarometric cell constructed of glass and filled with 0.1 N KCl solution saturated with HgCl; and (3) an electrical circuit consisting of a galvanometer, condenser, and a compensating circuit.

Temperature and gas flow rate were shown to affect diffusion current to some extent, but difficulties from these sources were avoided by working in selected operating ranges. The time lag of the cell was found to be a logarithmic function of the oxygen reading after an initial period of about one minute. Further work on improvement of the present instrument is in progress.

H. Hakewill

Hooper, J. H. D. DETERMINATION OF DISSOLVED OXYGEN (IN HYDROCARBON OILS). *Oil Gas J.* **47**, 276, 279 (1948) *November* 11.

A novel apparatus for the removal and measurement of dissolved gases in liquid petroleum products is described. The method is based on application of reduced pressure to 50 to 150 ml of the sample heated to 100°C. The oxygen content is then determined by one of the standard gas analyses. Degassing time varies from one to three hours depending on the viscosity of the oil.

H. R. Linden

Sulfur Determination

Morris, H. E., Lacombe, R. E. and Lane, W. H. QUANTITATIVE DETERMINATION OF ELEMENTAL SULFUR IN AROMATIC HYDROCARBONS. *Anal. Chem.* **20**, 1037-1039 (1948) *November.*

A modification of the quantitative volumetric method for determination of free sulfur in rubber has been applied to the determination of elemental sulfur in the range 0.1 to 20.0% in aromatic hydrocarbon samples. The procedure involves titrating a solution made up of the aromatic hydrocarbon, 15% sodium sulfite solution, 0.1% aqueous sodium stearate, 37% formaldehyde, 6N HCl, and 10% potassium iodide, with 0.1N potassium iodate to a 1 ml excess and back titrating with 0.1N sodium thiosulfate, The method depends on the reaction:

$$S + Na_2SO_3 \rightarrow Na_2S_2O_3.$$

A quantitative method for determining elemental sulfur in the range 0 to 100 p.p.m. is presented, but the results, although consistent, range quite high.

R. D. Clevenger

Viscometer

Fuidge, G. H., Deadman, A. L. and Hutton, A. L. THE E.V.T. VISCOMETER. *Chem. & Ind.* (British) **1948**, 601 (*September* 18).

A new type of concentric-cylinder torsion viscosimeter is described in detail and its use in determining equi-viscous temperatures (E.V.-T.) of tars is discussed. The E.V.T. is defined as the temperature in °C at which the viscosity is 50 seconds as determined on the Standard Tar Viscosimeter (British). Advantages of this method of tar characterization and of the new instrument are given.

H. R. Linden

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Davis, D. S. NOMOGRAPH FOR DETERMINATION OF WATER-VAPOR CONTENT OF NATURAL GAS. p. 26.

Edwards, A. H. THE ANALYSIS AND TESTING OF SOLID FUELS. PART II. CALORIFIC VALUE AND MINERAL MATTER. p. 21.

Plant, J. H. C. and Newling, A. B. S. CATALYTIC REMOVAL OF ORGANIC SULFUR COMPOUNDS FROM COAL GAS. p. 20.

Reynolds, F. M. THE OCCURRENCE OF VANADIUM, CHROMIUM AND OTHER UNUSUAL ELEMENTS IN CERTAIN COALS. p. 21.

8. GENERAL AND PHYSICAL CHEMISTRY

Adsorption

Keenan, A. G. THE RELATION BETWEEN THE B.E.T. AND LANGMUIR MULTILAYER ADSORPTION EQUATIONS. *J. Chem. Ed.* **25**, 666-667 (1948) *December.*

It is shown that the Brunauer-Emmett-Teller equation for multimolecular adsorption may be derived by a fairly straightforward procedure from Langmuir's expression for multimolecular adsorption.

S. Katz

Atomic Hydrogen Reactions

Badin, E. J. THE REACTION BETWEEN ATOMIC HYDROGEN AND MOLECULAR OXYGEN AT LOW PRESSURES. SURFACE EFFECTS. *J. Am. Chem. Soc.* **70**, 3651-3655 (1948) *November.*

Studies of the reaction between oxygen and atomic hydrogen at liquid air temperatures show that peroxide and water formation are proportional to the oxygen content. Mechanisms are proposed for the reaction. The effects of various wall materials appear due in part to moisture at the surfaces.

S. Katz

Badin, E. J. HYDROCARBON OXIDATION INITIATED BY ATOMIC HYDROGEN. *J. Am. Chem. Soc.* **70**, 3965-3966 (1948) *November.*

Aldehydes and ketone intermediates have been isolated in the atomic hydrogen initiated oxidation of a number of hydrocarbons. The evidence points to the tertiary bond as the initial point of attack, followed by the secondary and last, the primary.

S. Katz

Binding Energy

Cottrell, T. L. BINDING ENERGIES IN HYDROCARBONS. *J. Chem. Soc.* (British) **1948**, 1448-1453 *(September).*

At ordinary temperatures the energy of a molecule may be regarded as composed of chemical binding energy, zero point vibrational energy and heat content relative to the molecule at absolute zero. An estimate of total binding energy for several hydrocarbons was made and the results discussed as "binding-energy terms" rather than the conventional bond energy terms. In this way the relative instability of cyclohexane in comparison with normal hexane can be predicted.

C. H. Riesz

Carbon Oxidation

Riley, H. L. SOME STRUCTURAL ASPECTS OF CARBON OXIDATION. *Chem. & Ind.* (British) **1948**, 569-571 *(September* 4).

The relation between surface structure and susceptibility of carbons of different origins to oxidation is discussed. Available data are reviewed and it is concluded that the crystallographic structure and the presence of various so-called volatile impurities are major contributing factors.

S. Katz

Heats of Adsorption

Pierce, C. and Smith, R. N. HEATS OF ADSORPTION. PART I. *J. Phys. & Colloid Chem.* 52, 1111-1115 (1948) *October.*

Measurement of the heats of adsorption of ethyl

chloride on graphite show a differential heat of adsorption for the first few layers greatly in excess of the heat of liquefaction. With further adsorption, the heat of adsorption appears to approach the heat of liquefaction asymptotically.

S. Katz

Smith, R. N. and Pierce, C. HEATS OF ADSORPTION. PART II. *J. Phys. & Colloid Chem.* 52, 1115-1128 (1948) *October.*

A formula for heats of adsorption as a function of pressure has been derived. A modified isotherm equation is proposed which does not involve some of the limitations of the B.G.T. equation and which gives good agreement with experiment.

S. Katz

Thermodynamics

Edmister, W. C. APPLICATIONS OF THERMODYNAMICS TO HYDROCARBON PROCESSING. PART XIII—HEAT CAPACITIES. *Petroleum Refiner* 27, 609-615 (1948) *November.*

Methods of determining the vapor heat capacities for both real and ideal substances are described. Heat capacity relations are recapitulated and extended. Methods of applying pressure corrections with the aid of a generalized chart are given, and also procedures for calculatng C_p and C_v for real gases from the heat capacity at zero pressure. (C_{p_0}).

S. Katz

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Iley, R. and Riley, H. L. THE DEPOSITION OF CARBON ON VITREOUS SILICA. p. 19.

Kummer, J. T., DeWitt, T. W. and Emmett, P. H. SOME MECHANISM STUDIES ON THE FISCHER-TROPSCH SYNTHESIS USING C^{14}. p. 28.

Oulton, T. D. THE PORE SIZE-SURFACE AREA DISTRIBUTION OF A CRACKING CATALYST. p. 27.

Schuman, S. C. THE ROLE OF THE CARBIDES OF IRON IN THE FISCHER-TROPSCH SYNTHESIS. p. 28.

Whittingham, G. THE INFLUENCE OF SILICA SMOKES ON THE DEWPOINT OF COMBUSTION GASES CONTAINING SULFUR OXIDES. p. 21.

9. ORGANIC CHEMISTRY

Methylation of Naphthalene

Armstrong, G. P., Grove, D. H., Hammick, D. L. and Thompson, H. W. SOME CATALYZED GAS-PHASE REACTIONS OF AROMATIC HYDROCARBONS. PART III. THE METHYLATION OF NAPHTHALENE BY MEANS OF DIMETHYL ETHER. *J. Chem. Soc.* (British) 1948, 1700-1702 *(October).*

Naphthalene was methylated by reaction with dimethyl ether in the presence of bauxite catalyst. Low yields (2-7%) of monomethyl naphthalenes (mainly 1-methyl naphthalene) were obtained.

C. H. Riesz

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Cottrell, T. L. BINDING ENERGIES IN HYDROCARBONS. p. 32.

Dazeley, G. H. and Hall, C. C. PRODUCTION OF OLEFINS BY THE CRACKING OF FISCHER-TROPSCH WAXES AND THEIR CONVERSION INTO LUBRICATING OILS. p. 28.

Lovell, W. G. KNOCKING CHARACTERISTICS OF HYDROCARBONS. p. 29.

Morris, A. E., Lacombe, R. E. and Lane, W. H. QUANTITATIVE DETERMINATION OF ELEMENTAL SULFUR IN AROMATIC HYDROCARBONS. p. 31.

Sherwood, P. W. ACETYLENE FROM PETROLEUM. p. 27.

10. CHEMICAL ENGINEERING

Crushing and Grinding

Epstein, B. LOGARITHMICO-NORMAL DISTRIBUTION IN BREAKAGE OF SOLIDS. *Ind. Eng. Chem.* 40, 2289-2291 (1948) *December.*

It has been empirically recognized that certain types of crushing and grinding operations lead to the logarithmico-normal distribution. In this paper the breakage process is conceived of as depending on two basic functions. Under certain hypotheses concerning these functions, it can be proved that the distribution function is asymptotically logarithmico-normal. An example is given of a theoretical breakage mechanism, for which the size distribution data were generated synthetically by use of random sampling tables.

W. E. Ball

Fluid Flow

Lockhart, R. W. and Martinelli, R. C. PROPOSED CORRELATION OF DATA FOR ISOTHERMAL TWO-PHASE, TWO COMPONENT FLOW IN PIPES. *Chem. Eng. Progress* 45, 39-48 (1949) *January.*

A tentative correlation for the pressure drop attending isothermal flow of liquid and vapor simultaneously in pipes is proposed. It is possible to have either or both phases viscous or turbulent.

J. D. Parent

Stoll, H. W. FLUID FLOW MEASUREMENT IN PIPE SIZES BELOW TWO INCHES. *Petroleum Refiner* 27, 578-582 (1948) *November.*

The problem of measuring flow rates with primary elements producing pressure differentials in lines of two inches or less in diameter is discussed.

J. D. Parent

Foundation Design

Lazzari, C. C. THE DESIGN OF OCTAGONAL FOUNDATIONS. *Petroleum Refiner* 27, 629-634 (1948) *December.*

A detailed step by step calculation is presented for the design of a foundation for an 8 ft. o.d. tower, 53 ft. high. The assumptions are listed and the nomenclature is carefully defined. The items which are calculated include: (1) maximum soil pressure; (2) stability; (3) diagonal tension; (4) bottom reenforcing; (5) top reenforcing; and (6) anchor balls.

W. J. Merwin

Fractionation

Bailey, R. V. and Coates, M. J. SIMPLIFIED MULTICOMPONENT FRACTIONATION CALCULATIONS: DISTRIBUTION OF SPLIT KEY COMPONENTS. PART I. *Petroleum Refiner* 28, 106-109 (1949) *January.*

The application of Underwood's equations for determining the distribution of split key components of a multicomponent mixture is presented for the case of minimum reflux ratio. These equations are for constant relative volatility. In part two, which will follow, Colburn's

correlation will be considered. Also, other reflux ratios will be considered.

J. D. Parent

Vacuum Technique

Dushman, S. SCIENTIFIC ASPECTS OF VACUUM TECHNIQUE. *Chem. & Ind.* (British) **1948**, Supp. p. 3-8 (*October* 9).

Vacuum techniques are reviewed. The topics considered are pumps, gauges, leak detectors, getters, sorption and high vacuum techniques.

S. Katz

The following article, which has not been abstracted, is called to your attention:

Nelson, W. L. COST-IMATING FRACTIONATING TOWERS. *Oil Gas J.* **47**, 277 (1948) *December* 30.

The following article, the abstract for which appears on the page indicated, is also called to your attention:

Williamson, R. H. and Garside, J. E. APPLICATION OF FLUIDIZED SOLIDS TECHNIQUE TO COAL GAS PURIFICATION. p. 20.

AND INSTRUMENTATION
11. PROCESS EQUIPMENT

Heat Exchangers

Dougherty, P. F. and Brooks, C. H. TUBULAR HEAT EXCHANGERS—"IN PLACE" METHODS FOR CLEANING. *Petroleum Processing* **3**, 1211-1212 (1948) *December; Oil Gas J.* **47**, 83, 87-88 (1948) *December* 2; *Petroleum Refiner* **27**, 676-678 (1948) *December; Petroleum Engr.* **21**, C33-34, 36 (1949) *January.*

In order to use "in place" cleaning of heat exchangers, the fouling material must be capable of removal by chemical reaction, solution, or suspension in the cleaning fluid. The advantages of "in place" cleaning are said to be (1) less down-time; (2) less labor cost; (3) more uniform and thorough cleaning; (4) no loss of metal; (5) no scoring of metal surfaces. The authors list typical examples of situations where "in place" cleaning is used. Mechanical methods of cleaning include lancing, drilling and sand blasting.

W. J. Merwin

Instrumentation

Comstock, C. S. HOW GOOD INSTRUMENTATION CAN SAVE DOLLARS—PART I. *Chem. Ind.* **63**, 950-952 (1948) *December.*

Instrumentation saves money by reducing labor, capital, spoilage or by increased production in the same equipment. Cost figures are presented which show that the cost of 48 instruments is equal to the cost of one operator per year per shift. This is qualified by the necessity of having two men per shift in some cases for reasons of safety.

W. J. Merwin

Interconnected Control

Pellettere, J. A. INTERCONNECTED CONTROL—ITS USE FOR OFFSETTING UNFAVORABLE INSTRUMENTATION SYSTEM CHARACTERISTICS. *Petroleum Refiner* **27**, 641-644 (1948) *December*.

Interconnected control instrumentation can accomplish three things that three function (proportional, reset, derivative) control instruments alone cannot do: (1) minimize the effect of sudden load changes in the controlled fluid stream; (2) provide anticipatory action from a secondary high response instrument; and (3) maintain stable control conditions in the face of a temporary reversed signal. Flow diagrams are presented showing interconnected instrumentation as applied to each of the above situations. An outline is presented listing types of control and their characteristics, and an outline of general reasons for interconnected control is given.

W. J. Merwin

The following article, which has not been abstracted, is called to your attention:

Nelson, W. L. COST-IMATING VESSELS. *Oil Gas J.* **47**, 113 (1948) *December* 16.

The following article, the abstract for which appears on the page indicated, is also called to your attention:

Dushman, S. SCIENTIFIC ASPECTS OF VACUUM TECHNIQUE. p. 35

12. MATERIALS OF CONSTRUCTION

Protective Coatings

Munger, C. G. PLASTIC COATINGS AND CORROSION. *World Oil* **128**, 176-177, 180 (1949) *January*.

The vinyl chloride and vinyl chloride copolymer group of resins are considered protective coatings. Three factors essential for a successful plastic coating are; adhesion, film strength, and proper formulation for specific corrosion resistance and for resistance to moisture and moisture vapor transfer. The preparation of the surface before coating and the application of the coating are of utmost importance.

B. E. Hunt

Stainless Steel

Kiefer, G. C. and Sheridan, C. M. EFFECT OF COMPOSITION ON LOW-CARBON AUSTENITIC CHROMIUM-NICKEL STAINLESS STEELS. *Ind. Heating* **15**, 2090, 2092, 2096 (1948) *December*.

The results are reported of an attempt to correlate the composition of the above steels with their resistance to corrosion in various reagents. Tests were made on specimens in the fully annealed condition and after they had been exposed for varied lengths of time to a sensitizing process.

B. E. Hunt

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Hunter, J. B., McConomy, H. F. and Weston, R. F. ENVIRONMENTAL pH AS A FACTOR IN CONTROL OF ANAEROBIC BACTERIAL CORROSION. p. 24.

Schreiner, W. J. CATHODIC PROTECTION APPLIED TO GAS AND ELECTRIC UTILITY OPERATIONS. p. 25.

Stoltenberg, H. A. OXYGEN CONCENTRATION EFFECT ON FLOOD WATER IRON PICKUP. p. 25.

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LP Gas
Materials and Methods
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